November 15, 2018

Department of Molecular and Cell Biology
MS program in Genetics and Genomics

Students seeking an MS degree in the Genetics and Genomics AOC must meet the following requirements set forth by the Graduate School (in bold) and requirements set forth by the AOC:

1) Master's degrees may be earned under either of two plans, as determined by the advisory committee. The Thesis plan emphasizes research activities while the Non-Thesis plan requires comprehensive understanding of a more general character.
   a. The Thesis plan requires no fewer than 21 credits of advanced coursework and no fewer than nine additional credits of Master's Thesis Research (GRAD 5950 or 5960), as well as the writing and oral defense of a thesis. Please note that admission to MS program does not guarantee a placement in a thesis lab.
   b. The Non-Thesis plan requires no fewer than 30 credits of advanced coursework and a comprehensive final examination (see below).

2) Organize your committee (three faculty) and submit your plan of study no later than the beginning of the student's final semester before degree completion. The AOC head has to approve the plan of study.

3) No class may be repeated towards the minimum didactic credits.

Course requirements and timeline - Thesis Plan (21 credits):

1st semester (Fall), pick one didactic course:
MCB 5452 Problems in Genetics of Eukaryotes (3 credits)
MCB 5621 Molecular Biology and Genetics of Prokaryotes (3 credits)
MCB 5217 Biosynthesis of Nucleic Acids and Proteins (3 credits)

In addition to one course from the above list, you can register for:
MCB 5899-001 Graduate seminar (1 credit)
MCB 5899-002 (Introduction to Faculty Research (1 credit))

Prior to registering for courses for your second semester (typically spring), you must discuss planned coursework with the AOC head and/or your faculty advisor.

2nd semester (spring), pick one didactic course:
MCB 5426 Genetic Engineering and Functional Genomics (3 credits)
MCB 5454 Molecular Aspects of Genetics (2 credits)

Didactic coursework choice alternatives:
For students needing more basic background in genetics and functional genomics you may instead take one of these courses following discussion with your advisor and/or AOC head:
MCB 5896-063 Gene Expression (3 credits)
MCB 5896-037 Concepts of Genetic Analysis (3 credits)

In addition to one course selected from above, you may register for:
1-2 of the following courses:
GRAD 5910 Responsible Conduct of Research in Genomics and Life Sciences (1 credit)
MCB 5801 Scientific Writing and Project Development (2 credits)
MCB 5499 Current Topics in Genetics (1 credit)

3 credits of research MCB 6997 to perform in a thesis lab under a faculty advisor.
3rd semester onward*:
Choose from didactic courses not previously taken from the above lists and from the following:

### Fall Semester
- MCB 5430 Analysis of Eukaryotic Functional Genomic Data (3 credits)
- MCB 5243 Molecular Analysis of Development (3 credits)
- MCB 5445 Genome Dynamics and Epigenetics (3 credits)

### Spring Semester
- MCB 5896-027 Footprints of Natural Selection in the Genome (3 credits)
- EEB 4100 Big Data science for Biologists (3 credits)

Optional courses for students with a research focus on molecular evolution/microbial genetics:
- MCB 5471 Current Topics in Molecular Evolution (1 credit)
- MCB 3637 Practical Methods in Microbial Genomics (3 credits)
- EEB 6486 Systematics Seminar (1 credit)

* The following Intensive didactic courses are recommended for students with a research focus on molecular evolution/population genetics (note that these are not offered every year):
- MCB 5472 Computer Methods in Molecular Evolution (3 credits)
- EEB 5348 Population Genetics (3 credits)
- EEB 5349 Phylogenetics (3 credits)

### Course requirements and timeline - Non-Thesis Plan (30 credits):

1st semester (Fall), pick two or three of the following didactic courses:
- MCB 5452 Problems in Genetics of Eukaryotes (3 credits)
- MCB 5621 Molecular Biology and Genetics of Prokaryotes (3 credits)
- MCB 5217 Biosynthesis of nucleic acids and proteins (3 credits)

In addition to courses from the above list, you may register for:
- MCB 5899-001 Graduate seminar (1 credit)

Prior to registering for courses for your second semester (typically spring), you must discuss planned coursework with the AOC head and/or your faculty advisor.

2nd semester (spring), pick two or three didactic courses:
- MCB 5426 Genetic Engineering and Functional Genomics (3 credits)
- MCB 5454 Molecular Aspects of Genetics (2 credits)

Didactic coursework choice alternatives:
For students needing more basic background in genetics and functional genomics you may instead take one of these courses following discussion with your advisor and/or AOC head:
- MCB 5896-063 Gene Expression (3 credits)
- MCB 5896-037 Concepts of Genetic Analysis (3 credits)

In addition to the courses selected from above, you may register for:
- 1-2 of the following courses:
  - GRAD 5910 Responsible Conduct of Research in Genomics and Life Sciences (1 credit)
  - MCB 5801 Scientific Writing and Project Development (2 credits)
  - MCB 5499 Current Topics in Genetics (1 credit)
3rd semester onward*:
Choose from didactic courses not previously taken from the above lists and from the following:

**Fall Semester**
- MCB 5430 Analysis of Eukaryotic Functional Genomic Data (3 credits)
- MCB 5243 Molecular Analysis of Development (3 credits)
- MCB 5445 Genome Dynamics and Epigenetics (3 credits)

**Spring Semester**
- MCB 5896-027 Footprints of Natural Selection in the Genome (3 credits)
- EEB 4100 Big Data science for Biologists (3 credits)

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